

WHAT IS CLAIMED IS:

1 1. A method comprising
2 enabling a user to move an indicator that is
3 constrained to a 2D surface rendered in a projection of 3D
4 space on a display, the rendered 2D surface appearing to lie
5 obliquely to the display; and
6 effecting an action in response to the user's
7 control of the indicator.

1 2. The method of claim 1 further comprising enabling
2 the user to move a second indicator on the display, the second
3 indicator not being constrained to the 2D surface.

1 3. The method of claim 1 in which the 2D surface
2 comprises a plane.

1 4. The method of claim 1 in which the display comprises
2 rendered objects each having a position in the 3D space.

1 5. The method of claim 4 in which each object
2 corresponds to a file associated with a file-handling
3 application and the action comprises triggering the file-
4 handling application to open the file.

1 6. The method of claim 4 in which the display further
2 comprises object markers, each object marker corresponding to
3 an object and being rendered on the 2D surface at a position
4 associated with the location of the object.

1 7. The method of claim 1 in which the action comprises
2 altering the projection of the 3D space to indicate motion to
3 the user.

1 8. The method of claim 1 in which the action comprises
2 altering the projection of the 3D space to indicate to the
3 user a change in viewpoint in the 3D space along a circular
4 path, the center of which is on an axis perpendicular to the
5 2D surface at the position of the indicator.

1 9. The method of claim 1 in which the display comprises
2 rendered topographic elements that orient the user's
3 perception of the 3D space.

1 10. A method comprising:
2 rendering a first view of a 3D space from a first
3 reference point, the 3D space comprising objects, a 2D
4 surface, and a first indicator on the 2D surface;
5 detecting a user's control of a second indicator
6 that is moveable in the first view; and
7 rendering a second view of the 3D space as a
8 function of the user's control of the second indicator.

1 11. The method of claim 10 in which movement of the
2 second indicator in the first view is coupled to movement of
3 the first indicator on the 2D surface.

1 12. The method of claim 11 in which the first indicator
2 is located at a predetermined position in the first view, and
3 the second view restores the first indicator to the
4 predetermined position.

1 13. The method of claim 10 in which the second indicator
2 specifies a selected point in the first view of the 3D space
3 and the second view relocates the first indicator to a
4 position on the 2D surface that is associated with the
5 selected point.

1 14. The method of claim 13 in which the position
2 associated with the selected point is on the 2D surface and is
3 intersected by a line normal to the 2D surface through the
4 selected point.

1 15. The method of claim 10 or 14 in which the second
2 view is from a second reference point that is closer to the
3 first indicator than the first reference point.

1 16. The method of claim 10 in which the second view is
2 from the first reference point.

17. A method comprising:

displaying a projection of a 3D space that comprises a 2D surface, a user-selected object, and an indicator positioned on the surface at a position associated with the user-selected object, the projection simulating a user's perspective from a first viewpoint;

receiving a directional cue from the user with respect to the indicator;

determining a second viewpoint based on the directional cue;

displaying a sequence of projections of the 3D space and a projection of the second viewpoint, the sequence simulating motion from the first viewpoint to the second viewpoint.

18. The method of claim 17 in which the indicator is positioned near or at a point on the surface through which an axis normal to the surface intersects the user-selected object.

19. The method of claim 17 in which the motion comprises motion that circumnavigates the user-selected object.

20. The method of claim 17 or 19 in which the second viewpoint includes the user-selected object.

1 21. The method of claim 17 or 19 in which the second
2 viewpoint includes the user-selected object at the same
3 relative position in the projection of the second viewpoint as
4 the position of the user-selected object in the projection of
5 the first viewpoint.

1 22. A system comprising:
2 a display unit that displays a rendering of a 3D
3 space that comprises a 2D surface that appears to be oblique
4 to the display unit;
5 a memory unit that stores information about objects
6 located in the 3D coordinate space and a user's viewpoint;
7 a user interface configured to receive user controls
8 for moving an indicator on the 2D surface; and
9 a processor configured to
10 compute a rendering of the 3D space from the
11 stored information;
12 couple the user controls to movement of the
13 indicator; and
14 trigger a process based on location of the
15 indicator.

1 23. The method of claim 22 in which the process comprises
2 computing a second rendering of the 3D space, the second
3 rendering restoring the indicator to a preferred position
4 relative to display unit.

1 24. The method of claim 23 in which the process comprises
2 selecting an object in the 3D space that is located near an
3 axis that is normal to the 2D surface and that intersects the
4 indicator.

1 25. An article comprising a machine-readable medium
2 that stores machine-executable instructions, the instructions
3 causing a machine to:

4 render a first projection of a 3D space from a first
5 viewpoint, the space comprising objects, a 2D surface, and a
6 first indicator located on the 2D surface;

7 detect a user's control of a second indicator that is
8 moveable in the first projection; and

9 render a second projection of the 3D space as a function
10 of the user's control of the second indicator.

1 26. The article of claim 25 in which movement of the
2 first indicator on the 2D surface is coupled to the user's
3 control of the second indicator.

1 27. The article of claim 26 in which the first indicator
2 is located a preferred position relative to the frame of the
3 first projection, and the second view restores first indicator
4 to the preferred position.

1 28. The article of claim 25 in which second projection
2 enhances representation of an object located near a line that

3 intersects the first indicator and is perpendicular to the 2D
4 surface.

1 29. The article of claim 25 in which the user's control
2 of the second indicator specifies a selected object from the
3 objects in the space, and the second projection comprises the
4 first indicator located on the 2D surface at a position
5 associated with the selected object.

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